

In the Claims

The following is a complete listing of the claims and replace all prior claims in the application:

1 1. (Withdrawn) A method for forming self-pinned abutted junction heads,
2 comprising:
3 forming a free layer having a first end and a second end defining a width selected
4 to form a desired trackwidth; and
5 forming an extended self-pinned bias layer extending beyond the ends of the free
6 layer, the self-pinned bias layer extending beyond the free layer increasing the volume of
7 the extended self-pinned bias layer to provide greater thermal stability and stronger
8 pinning of the free layer.

1 2. (Withdrawn) The method of claim 1 further comprising forming a self-
2 pinned layer on a side of the free layer opposite the self-pinned bias layer, the self-pinned
3 layer extending beyond the ends of the free layer wherein the free layer is disposed at a
4 central region of the self-pinned layer.

1 3. (Withdrawn) The method of claim 2, wherein the forming the self-pinned
2 bias layer and the self-pinned layer further comprises forming a self-pinned bias layer
3 and a self-pinned layer having increased stress anisotropy.

1 4. (Withdrawn) The method of claim 1 further comprising forming a spacer
2 layer between the free layer and the self-pinned bias layer.

1 5. (Withdrawn) The method of claim 1 further comprising forming a first
2 shield layer interleaving the self-pinned layer between the first shield layer and the free
3 layer and forming a second shield layer interleaving the self-pinned bias layer between
4 the second shield layer and the free layer.

1 6. (Withdrawn) The method of claim 5 further comprising forming a first
2 seed layer between the first shield layer and the self-pinned layer and forming a second
3 seed layer between the self-pinned bias layer and the second shield layer.

1 7. (Withdrawn) The method of claim 1, wherein the forming the extended
2 self-pinned bias layer further comprises forming the extended self-pinned bias layer with
3 a large negative magnetostriction.

1 8. (Withdrawn) The method of claim 7 further comprising forming a self-
2 pinned layer on a side of the free layer opposite the self-pinned bias layer, the self-pinned
3 layer having a large positive magnetostriction.

1 9. (Currently Amended) A self-pinned abutted junction magnetic read
2 sensor, comprising:
3 a free layer having a first end and a second end defining a width selected to form
4 a desired trackwidth; and
5 ~~an extended~~ a self-pinned ferromagnetic bias layer extending beyond the ends of
6 the free layer, the self-pinned ferromagnetic bias layer extending beyond the free layer to
7 increasing increase the volume of the extended self-pinned bias layer thereby improving
8 ~~to provide greater~~ thermal stability and ~~stronger~~ pinning of the free layer.

1 10. (Currently Amended) The sensor of claim 9 further comprising a self-
2 pinned layer formed on a side of the free layer opposite from the self-pinned bias layer,
3 the self-pinned layer extending beyond the ends of the free layer wherein the free layer is
4 disposed at a central region of the self-pinned layer and wherein the self-pinned bias layer
5 and the self-pinned layer have increased stress anisotropy.

1 11. (Currently Amended) The sensor of claim 9 ~~10, wherein the self-pinned~~
2 ~~bias layer and the self-pinned layer have increased stress anisotropy~~ further comprising a
3 first and second hard bias layer abutting at least a portion of the first and second ends of
4 the free layer in a longitudinal direction.

1 12. (Currently Amended) The sensor of claim 9 further comprising a spacer
2 layer formed between the free layer and the self-pinned ferromagnetic bias layer.

1 13. (Currently Amended) The sensor of claim 9 further comprising a first
2 shield layer interleaving the self-pinned layer between the first shield layer and the free
3 layer and a second shield layer interleaving the self-pinned ferromagnetic bias layer
4 between the second shield layer and the free layer.

1 14. (Currently Amended) The sensor of claim 13 further comprising a first
2 seed layer formed between the first shield layer and the self-pinned layer and a second
3 seed layer formed between the self-pinned ferromagnetic bias layer and the second shield
4 layer.

1 15. (Currently Amended) The sensor of claim 9, wherein the ~~extended~~ self-
2 pinned ferromagnetic bias layer further comprises a large negative magnetostriction.

1 16. (Currently Amended) The sensor of claim 15 further comprising a self-
2 pinned layer formed on a side of the free layer opposite the self-pinned ferromagnetic
3 bias layer, the self-pinned layer having a large positive magnetostriction.

1 17. (Currently Amended) A magnetic storage system, comprising:
2 a moveable magnetic storage medium for storing data thereon;
3 an actuator positionable relative to the moveable magnetic storage medium; and
4 a magnetoresistive sensor, coupled to the actuator, for reading data from the
5 magnetic recording medium when position to a desired location by the actuator, wherein
6 the magnetoresistive sensor further comprises:
7 a free layer having a first end and a second end defining a width selected
8 to form a desired trackwidth; and
9 ~~an extended~~ a self-pinned ferromagnetic bias layer extending beyond the
10 ends of the free layer, the self-pinned ferromagnetic bias layer extending beyond the free
11 layer ~~to increasing~~ increase the volume of the extended self-pinned bias layer thereby
12 improving to provide greater thermal stability and ~~stronger~~ pinning of the free layer.

1 18. (Currently Amended) The magnetic storage system of claim 17 further
2 comprising a self-pinned layer formed on a side of the free layer opposite from the self-
3 pinned bias layer, the self-pinned layer extending beyond the ends of the free layer
4 wherein the free layer is disposed at a central region of the self-pinned layer and wherein
5 the self-pinned bias layer and the self-pinned layer have increased stress anisotropy.

1 19. (Currently Amended) The magnetic storage system of claim 17 ~~18~~,
2 ~~wherein the self pinned bias layer and the self pinned layer have increased stress~~
3 ~~anisotropy~~ further comprising a first and second hard bias layer abutting at least a portion
4 of the first and second ends of the free layer in a longitudinal direction.

1 20. (Currently Amended) The magnetic storage system of claim 17 further
2 comprising a spacer layer formed between the free layer and the self-pinned
3 ferromagnetic bias layer.

1 21. (Currently Amended) The magnetic storage system of claim 17 further
2 comprising a first shield layer interleaving the self-pinned layer between the first shield
3 layer and the free layer and a second shield layer interleaving the self-pinned
4 ferromagnetic bias layer between the second shield layer and the free layer.

1 22. (Currently Amended) The magnetic storage system of claim 21 further
2 comprising a first seed layer formed between the first shield layer and the self-pinned
3 layer and a second seed layer formed between the self-pinned ferromagnetic bias layer
4 and the second shield layer.

1 23. (Currently Amended) The magnetic storage system of claim 17, wherein
2 the ~~extended~~ self-pinned ferromagnetic bias layer further comprises a large negative
3 magnetostriction.

1 24. (Currently Amended) The magnetic storage system of claim 23 further
2 comprising a self-pinned layer formed on a side of the free layer opposite the self-
3 ferromagnetic pinned bias layer, the self-pinned layer having a large positive
4 magnetostriction.

1 25. (Currently Amended) A self-pinned abutted junction magnetic read
2 sensor, comprising:
3 means for sensing having a first end and a second end defining a width selected to
4 form a desired trackwidth; and
5 ferromagnetic means for biasing the means for sensing, the means for biasing the
6 means for sensing extending beyond the ends of the means for sensing, the extension of
7 the means for biasing the means for sensing ~~increasing~~ to increase the volume of the
8 means for biasing to improve ~~provide greater~~ thermal stability and ~~stronger~~ pinning of the
9 free layer.

1 26. (Withdrawn) A magnetic storage system, comprising:
2 a moveable magnetic storage means for storing data thereon;
3 an actuator positionable relative to the moveable magnetic storage medium; and
4 a magnetoresistive sensor, coupled to the actuator, for reading data from the
5 magnetic recording medium when position to a desired location by the actuator, wherein
6 the magnetoresistive sensor further comprises:
7 means for sensing having a first end and a second end defining a width
8 selected to form a desired trackwidth; and
9 means for biasing the means for sensing, the means for biasing the means
10 for sensing extending beyond the ends of the means for sensing, the extension of the
11 means for biasing the means for sensing increasing the volume of the means for biasing
12 to provide greater thermal stability and stronger pinning of the free layer.